



## General

### Guideline Title

Emergency nursing resource: orthostatic vital signs.

### Bibliographic Source(s)

ENA Emergency Nursing Resources Development Committee. Emergency nursing resource: orthostatic vital signs. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 12 p. [26 references]

### Guideline Status

This is the current release of the guideline.

## Recommendations

### Major Recommendations

The grades of recommendations (A–C, Not Recommended), levels of evidence (I–VII), and quality of evidence (I–IV) are defined at the end of the "Major Recommendations" field.

#### Description of Decision Options/Interventions and the Level of Recommendation

##### 1. Adults (age 17 years and older)\*

- The individual should rest in a flat, supine position 5-10 minutes prior to the first blood pressure measurement. Level B - Moderate
- Blood pressure measurements should be taken at one and three minutes after standing. Level B - Moderate
- Position change from supine to standing has better diagnostic accuracy in volume depleted adults compared to position changes from supine to sitting and then to standing. Level B - Moderate
- Orthostatic vital signs alone lack the sensitivity to reliably detect volume losses less than 1,000 ml. Level B - Moderate
- Symptoms such as dizziness and syncope, in combination with orthostatic vital signs, are more sensitive indicators of volume loss than vital sign changes alone. Therefore, symptoms and vital signs should be documented as the orthostatic variables. Level B - Moderate
- When measuring orthostatic vital signs, one or more of the following findings may indicate intravascular volume loss in adult patients: Level B - Moderate
  - Decrease in systolic blood pressure of 20 mmHg or more
  - Decrease in diastolic blood pressure of 10 mmHg or more
  - Increase in heart rate of 20 or greater beats per minute (Durukan et al., 2009).

##### 2. Pediatric and Adolescent (less than 17 years)

- There is *insufficient evidence* in the literature to make recommendations regarding orthostatic vital signs in the pediatric or

adolescent population with fluid volume alterations.

\*The correct procedure for measuring blood pressure while the patient is seated or standing is to measure the blood pressure in the upper arm while supporting the patient's arm and back. The legs should be uncrossed.

#### Definitions:

#### Levels of Recommendation for Practice

##### Level A Recommendations: High

- Reflects a high degree of clinical certainty
- Based on availability of high quality Level I, II and/or III evidence available using Melnyk & Fineout-Overholt grading system\* (see the "Rating Scheme for the Strength of the Evidence" field)
- Based on consistent and good quality evidence; has relevance and applicability to emergency nursing practice
- Is beneficial

##### Level B Recommendations: Moderate

- Reflects moderate clinical certainty
- Based on availability of Level III and/or Level IV and V evidence using Melnyk & Fineout-Overholt grading system\* (see the "Rating Scheme for the Strength of the Evidence" field)
- There are some minor flaws or inconsistencies in quality of evidence; has relevance and applicability to emergency nursing practice
- Is likely to be beneficial

##### Level C Recommendations: Weak

- Level V, VI and/or VII evidence available using Melnyk & Fineout-Overholt grading system\* (see the "Rating Scheme for the Strength of the Evidence" field) - Based on consensus, usual practice, evidence, case series for studies of treatment or screening, anecdotal evidence, and/or opinion
- There is limited or low quality patient-oriented evidence; has relevance and applicability to emergency nursing practice
- Has limited or unknown effectiveness

##### Not Recommended for Practice

- No objective evidence or only anecdotal evidence available; or the supportive evidence is from poorly controlled or uncontrolled studies
- Other indications for not recommending evidence for practice may include:
  - Conflicting evidence
  - Harmfulness has been demonstrated
  - Cost or burden necessary for intervention exceeds anticipated benefit
  - Does not have relevance or applicability to emergency nursing practice
- There are certain circumstances in which the recommendations stemming from a body of evidence should not be rated as highly as the individual studies on which they are based. For example:
  - Heterogeneity of results
  - Uncertainty about effect magnitude and consequences
  - Strength of prior beliefs
  - Publication bias

#### Grading the Levels of Evidence\*

- I. Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs) or evidence-based clinical practice guidelines based on systematic reviews of RCTs
- II. Evidence obtained from at least one properly designed randomized controlled trial
- III. Evidence obtained from well-designed controlled trials without randomization
- IV. Evidence obtained from well-designed case control and cohort studies

- V. Evidence from systematic reviews of descriptive and qualitative studies
- VI. Evidence from a single descriptive or qualitative study
- VII. Evidence from opinion of authorities and/or reports of expert committees

#### Grading the Quality of the Evidence

- I. Acceptable Quality: No concerns
- II. Limitations in Quality: Minor flaws or inconsistencies in the evidence
- III. Major Limitations in Quality: Many flaws and inconsistencies in the evidence
- IV. Not Acceptable: Major flaws in the evidence

\*Melnik, B. M., & Fineout-Overholt, E. (2005). Evidence-based practice in nursing and healthcare: A guide to best practice. Philadelphia, PA: Lippincott, Williams, & Wilkins.

## Clinical Algorithm(s)

None provided

## Scope

## Disease/Condition(s)

Conditions resulting in significant fluid volume loss (hypovolemia)

## Guideline Category

Evaluation

Technology Assessment

## Clinical Specialty

Emergency Medicine

Nursing

## Intended Users

Advanced Practice Nurses

Nurses

Physicians

## Guideline Objective(s)

To evaluate what orthostatic vital sign procedure is needed to detect significant fluid volume alteration in adult and pediatric patients

## Target Population

Adult and pediatric patients receiving emergency care

## Interventions and Practices Considered

Measurement of orthostatic vital signs:

- Heart rate
- Blood pressure
- Symptom assessment

## Major Outcomes Considered

- Incidence of orthostatic hypotension
- Vital signs (blood pressure, heart rate)
- Sensitivity of diagnostic testing

## Methodology

### Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

### Description of Methods Used to Collect/Select the Evidence

The following databases were searched for relevant literature: Medline (PubMed), CINAHL, Cochrane, BioMed Central-Open Access, Google Scholar, and National Guideline Clearinghouse. Various terms appear in the literature relating to vital sign changes with position changes. These terms are: tilt test (which may involve passive versus active position change), postural vital signs, and orthostatic vital signs.

Searches were conducted using the key words and subject headings: blood pressure, hypotension, orthostatics, orthostatic hypotension, orthostatic vital signs, orthostatic, and vital signs. The search term of "hypovolemic" was added to identify orthostatic vital sign research related to volume status rather than pharmacological treatment. Initial searches were limited to English language from January 1990 to March 2011. This timeframe was later expanded to include orthostatic research dating back to the 1940s to retrieve the seminal orthostatic vital sign studies. In addition, the reference lists in the selected articles were scanned for pertinent research findings. Research articles from emergency department (ED) settings, non-ED settings, position statements and guidelines from other sources were also reviewed.

Articles that met the following criteria were chosen to formulate the Emergency Nursing Resource (ENR): research studies, meta-analyses, systematic reviews and existing guidelines relevant to the topic of orthostatic vital signs and hypovolemia. Other types of reference articles and textbooks were also reviewed and used to provide additional information.

### Number of Source Documents

13 documents were included in the evidence tables.

### Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

### Rating Scheme for the Strength of the Evidence

## Grading the Levels of Evidence\*

- I. Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs) or evidence-based clinical practice guidelines based on systematic reviews of randomized controlled trials (RCTs)
- II. Evidence obtained from at least one properly designed RCTs
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## Methods Used to Analyze the Evidence

### Systematic Review with Evidence Tables

## Description of the Methods Used to Analyze the Evidence

The Emergency Nursing Resource (ENR) authors used standardized worksheets, including the Evidence-Appraisal Table Template, Critique Worksheet and Appraisal of Guidelines Research and Evaluation (AGREE) Work Sheet (see the methodology companion in the "Availability of Companion Documents" field), to prepare tables of evidence ranking each article in terms of the level of evidence, quality of evidence, and relevance and applicability to practice. Clinical findings and levels of recommendations regarding patient management were then made by the Emergency Nursing Resources Development Committee according to Emergency Nurses Association's (ENA's) classification of levels of recommendation for practice: Level A High, Level B Moderate, Level C Weak, or Not recommended for practice (see the "Rating Scheme for the Strength of the Recommendation" field).

## Methods Used to Formulate the Recommendations

### Expert Consensus

## Description of Methods Used to Formulate the Recommendations

All members of the Subcommittee independently complete an exhaustive review of all identified literature, complete a separate evidence table for each topic (if possible), and then reconvene to reach consensus. Each subgroup prepares a description of the topic, definition, background, significance, and evidence table. The Subcommittee identifies and assigns preliminary scores for quality and strength of evidence, and describes conclusions based on the review of the body of evidence. The entire Committee reads the articles and reviews the evidence-appraisal tables for each topic and then finalizes implications for practice and the level of recommendation.

## Rating Scheme for the Strength of the Recommendations

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## Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

## Method of Guideline Validation

Internal Peer Review

## Description of Method of Guideline Validation

The Institute for Emergency Nursing Research (IENR) Advisory Council reviews the final document for overall validity and provides feedback as

appropriate using the Emergency Nursing Resource (ENR) Evaluation Worksheet. Reviews and feedback are sent to the subgroup to evaluate and incorporate, as appropriate. Emergency Nurses Association (ENA) staff creates the final products for publication with input from the Committee.

## Evidence Supporting the Recommendations

### References Supporting the Recommendations

Durukan P, Ikizceli I, Akdur O, Ozkan S, Sozuer EM, Avsarogullari L, Akpinar G. Use of the shock index to diagnose acute hypovolemia. Turk J Med Sci. 2009;39(6):833-5.

### Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is specifically stated for each recommendation (see the "Major Recommendations" field).

## Benefits/Harms of Implementing the Guideline Recommendations

### Potential Benefits

Appropriate use of orthostatic vital signs as indicators of fluid volume alterations

### Potential Harms

During position change, from supine to standing, complex homeostatic mechanisms such as increased heart rate and vascular resistance typically compensate for the effects of gravity on the circulation to maintain cerebral blood flow. In general, the literature suggests the compensatory mechanisms may be impaired in the hypovolemic person predisposing them to weakness, dizziness, syncope, and the increased risk of falls.

## Contraindications

### Contraindications

Contraindications for measuring orthostatic vital signs include: supine hypotension, shock, severe altered mental status and injuries to the spine, pelvis, or lower extremities.

## Qualifying Statements

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- The Emergency Nurses Association's (ENA's) Emergency Nursing Resources (ENRs) are developed by ENA members to provide emergency nurses with evidence-based information to utilize and implement in their care of emergency patients and families. Each ENR focuses on a clinical or practice-based issue, and is the result of a review and analysis of current information believed to be reliable. As such, information and recommendations within a particular ENR reflect the current scientific and clinical knowledge at the time of publication, are only current as of their publication date, and are subject to change without notice as advances emerge.
- In addition, variations in practice, which take into account the needs of the individual patient and the resources and limitations unique to the institution, may warrant approaches, treatments and/or procedures that differ from the recommendations outlined in the ENRs. Therefore, these recommendations should not be construed as dictating an exclusive course of management, treatment or care, nor does the use of such

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## Implementation of the Guideline

### Description of Implementation Strategy

An implementation strategy was not provided.

### Implementation Tools

Quick Reference Guides/Physician Guides

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

## Institute of Medicine (IOM) National Healthcare Quality Report Categories

### IOM Care Need

Getting Better

### IOM Domain

Effectiveness

Safety

## Identifying Information and Availability

### Bibliographic Source(s)

ENA Emergency Nursing Resources Development Committee. Emergency nursing resource: orthostatic vital signs. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 12 p. [26 references]

### Adaptation

Not applicable: The guideline was not adapted from another source.

### Date Released

2011 Dec



## Guideline Developer(s)

Emergency Nurses Association - Professional Association

## Source(s) of Funding

Emergency Nurses Association

## Guideline Committee

2011 ENA Emergency Nursing Resources Development Committee

## Composition of Group That Authored the Guideline

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## Financial Disclosures/Conflicts of Interest

Not stated

## Guideline Status

This is the current release of the guideline.

## Guideline Availability

Electronic copies: Available in Portable Document Format (PDF) from the [Emergency Nurses Association Web site](#) .

## Availability of Companion Documents

The following are available:

- ENA Clinical Guidelines for Emergency Nursing Practice Committee. Guidelines for the development of clinical practice guidelines. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 30 p. Electronic copies: Available in Portable Document Format (PDF) from the [Emergency Nurses Association Web site](#) .
- Clinical practice guideline: orthostatic vital signs. Synopsis. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 1 p. Electronic copies: Available in PDF from the [Emergency Nurses Association Web site](#) .
- CPG evidence table: orthostatic vital signs. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 7 p. Electronic copies: Available in PDF from the [Emergency Nurses Association Web site](#) .
- CPG other resources table: orthostatic vital signs. Other resources table. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 2 p. Electronic copies: Available in PDF from the [Emergency Nurses Association Web site](#) .

## Patient Resources

None available

## NGC Status

This NGC summary was completed by ECRI Institute on July 2, 2012. The information was verified by the guideline developer on August 13, 2012.

## Copyright Statement

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